

Interaction of chlorinated...

S/190/63/005/003/003/024
B101/B186

of the initial polyethylene were not changed by chlorination and that it was maintained also after amination. With high chlorine content the aminated products were dark-colored, insoluble owing to the cross-linking, and easily dehydrochlorinated while forming C-C bonds. In the product obtained by reaction with anilin a weak 1600 cm^{-1} band proved the presence of aromatic rings. Vinyl-, vinylidene-, or other alkene groups could not be detected. In the reaction product with Di-n-butylamine, C-N bonds (1073 cm^{-1}) and C-C bonds could be detected ($1600 - 1700\text{ cm}^{-1}$ bands). These bands, however, were so diffuse that the alkene groups could not be identified. The reaction product with ammonia showed weak and 682 and 796 cm^{-1} bands, corresponding to the stretching vibrations of the C-Cl bonds as a wide $1580 - 1700\text{ cm}^{-1}$ band caused by the superposition of the 1580 cm^{-1} NH_2 band with the C-C stretching vibrations ($1680 - 1620\text{ cm}^{-1}$). There are 2 figures and 3 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis AS USSR)

SUBMITTED: July 22, 1961
Card 2/2

KRENTSEL', B. A.

AID Nr. 972-34 21 May

NEW POLYMERIC SCHIFF BASES AND THEIR ELECTROPHYSICAL PROPERTIES (USSR)

Davydov, B. E., B. A. Krentsel', Yu. A. Popov, and L. V. Prokof'yeva.
Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, Mar 1963, 321-324.

S/190/63/005/003/004/024

New polymeric Schiff bases with conjugated bonds and with a hetero atom in the backbone have been synthesized by polycondensation of p-phenylenediamine (PPDA) with 2,3-butanedione (I), terephthalaldehyde (II), or glyoxal (III). The polycondensation products of PPDA and I (polymer Π -1), II (Π -2), or III (Π -3) are black, brown, or yellow powders, respectively. All three are soluble in sulfuric acid, and Π -1 and Π -2, in formic and phosphoric acids also. IR spectra indicate $=C-C=$ bonds and a 1,4-substituted benzene ring in Π -1 and Π -3 and a methyl radical in Π -1. X-ray analysis shows that Π -1 and Π -2 have a crystalline structure and that Π -3 is amorphous. Π -3 emits a single, narrow EPR signal indicating the delocalization of electrons in the system of

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AID Nr. 972-34 21 May

NEW POLYMERIC SCHIFF BASES [Cont'd]

S/190/63/005/003/004/024

conjugated bonds; Π -1 and Π -2 emit no EPR signals. Heat treatment of Π -1, Π -2, and Π -3 for 4 hrs resulted in the following losses in weight: at 250°C, 12.87, 3.56, and 20.9%; and at 300°C, 17.20, 5.16, and 27.40%, respectively. Heat-treated Π -1 and Π -2 emit a single, narrow EPR signal, probably because of further polycondensation, which results in a longer polyconjugation chain. The electrical conductivity (σ) of the synthesized substances is related to temperature by

$$\sigma = \sigma_0 e^{-\Delta E/2kT}$$

σ_0 varied from $1.8 \cdot 10^5 \text{ ohm}^{-1} \cdot \text{cm}^{-1}$ for Π -2 to $3.2 \cdot 10^{-4} \text{ ohm}^{-1} \cdot \text{cm}^{-1}$ for thermally treated Π -3; σ_{20} varied from $2.5 \cdot 10^{-11} \text{ ohm}^{-1} \cdot \text{cm}^{-1}$ for thermally treated Π -3 to $1.1 \cdot 10^{-18} \text{ ohm}^{-1} \cdot \text{cm}^{-1}$ for Π -1. The study was carried out at the Institute of Petrochemical Synthesis, Academy of Sciences USSR. [BAQ]

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8/190/63/005/004/013/020
B101/B220

AUTHORS: Krentsel', B. A., Semenido, G. Ye., Il'ina, D. Ye.

TITLE: Degradation of polymers containing chlorine. I. Degradation of chlorinated polypropylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 558-563

TEXT: Chlorinated polypropylene (CPP) containing 3 - 75.25 % Cl was heated in vacuo at 100 - 250°C and the gases evolved were determined chromatographically, while the HCl liberated was measured argentometrically. Up to 238°C only HCl is liberated in quantities increasing with the temperature. The rate of CPP degradation is constant for the first 10 - 20 min, after which the degradation reaches a certain degree and then ceases at the given temperature. This is attributed to possible intramolecular and intermolecular dehydrochlorination, in the latter case with crosslinking. For the intramolecular process $k_1 = A_1 \exp(-E_1/RT)$, for the intermolecular process $k_2 = A_2 \exp(-E_2/RT)$, where $E_2 < E_1$, $A_2 > A_1$. Hence, at low temperatures $k_2 > k_1$, intermolecular dehydrochlorination sets in, and

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B101/B220

Degradation of polymers ...

since HCl liberation from the crosslinked polymer is made difficult it ceases at a given temperature. The mean effective activation energy of this dehydrochlorination is $E = 8$ kcal/mole. CPP with 45 % Cl, in which thus all H atoms bound to tertiary C atoms are substituted by Cl, shows the lowest heat resistance. There are 6 figures and 2 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis of AS USSR)

SUBMITTED: October 2, 1961

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S/190/63/005/004/014/020
B101/B220

AUTHORS: Krentsel', B. A., Semenid, G. Ye., Il'ina, D. Ye., Shishkina, M. V.

TITLE: Degradation of polymers containing chlorine. II. Dehydrochlorination mechanism of chlorinated polypropylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 564-567

TEXT: The IR spectra of chlorinated polypropylene were studied after thermal treatment at 120 and 238°C. A comparison with the IR spectrum of polypropylene shows that chlorine substitutes mainly the H atoms bound to the tertiary C atoms. Thermal treatment at 120°C had almost no effect on the IR spectrum. At 238°C, however, several bands were observed which confirmed crosslinking by intermolecular dehydrochlorination. A discussion of the possible reaction processes shows that a radical mechanism is improbable since its activation energy, $E = 36.5$ kcal/mole, is higher than the activation energy of dehydrochlorination, $E = 8$ kcal/mole, and the radical process sets in only above 140°C. Hence an ionic mechanism is assumed. The polarizing effect of chlorine induces positive charges at the α and β

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Degradation of polymers ...

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C atoms so that protons are knocked out and crosslinking sets in. There is 1 figure.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis of AS USSR)

SUBMITTED: October 2, 1961

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AYRAPETYANTS, A.V.; VOYTENKO, R.M.; DAVYDOV, B.E.; KRENTSEL', B.A.

Electric conductance mechanism in organic semiconductor polymers.
Dokl. AN SSSR 148 no.3:605-608 Ja '63. (MIRA 1642)

1. Institut neftekhimicheskogo sinteza AN SSSR i Institut polu-
provodnikov AN SSSR. Predstavleno akademikom V.A. Karginym.
(Polymers—Electric properties) (Semiconductors)

STOTSKAYA, L.L.; KRENTSEL', B.A.

New data on the mechanism of ethylene polymerization in the presence
of a soluble catalytic system $\text{--Sn(C}_6\text{H}_5)_4 + \text{AlBr}_3 + \text{VCl}_4$. Dokl.
AN SSSR 151 no.3:595-596 J1 '63. (MIRA 16:9)

1. Institut neftekhimicheskogo sinteza AN SSSR.
(Ethylene) (Polymerization) (Catalysis)

ALIYEV, A.D.; ARBATSKIY, A.V.; SHISHKINA, M.V.; KRENTSEL', B.A.

Stereospecific polymerization of trans-1-phenyl-1,3-butadiene.
Dokl. AN SSSR 153 no.2:333-335 N '63. (MIRA 16:12)

1. Institut neftekhimicheskogo sinteza AN SSSR. Predstavleno
akademikom V.A.Karginym.

KRENTSEL', Boris Abramovich; TOPCHIEV, A.V., akademik, otv.
red.[deceased]; FOVAREV, L.S., red.

[Chlorination of paraffin hydrocarbons] Khlorirovaniye
parafinovykh uglevodorodov. Moskva, Nauka, 1964. 157 p.
(MIRA 17:8)

KRENTSEL', Boris Abramovich, doktor khim. nauk; SIDOROVA,
Lyudmila Grigor'yevna, kand. tekhn. nauk

[Polypropylene] Polipropilen. Kiev, Tekhnika, 1962. 89 p.
(MIRA 18:1)

L 16034-65 EWT(m)/EPF(c)/EWP(j)/T P2-4/Pr-4 AFRL/SSD/ASD(m)-3/AS(m)-2/AFETR/
 ACCESSION NR: AP4045800 RAEM(a)/ESD(t)S/0062/64/000/009/1697/1700
 RAEM(c) RM

AUTHORS: Nasirov, F.M; Karpacheva, G.P.; Davy*dov, B.E.; Krentsel',
 B.A.

TITLE: Structure of the soluble complex organometallic catalyst for
 acetylene polymerization

SOURCE: AN SSSR. Izv. Seriya khimicheskaya, no. 9, 1964, 1697-1700

TOPIC TAGS: acetylene polymerization catalyst, complex organometal-
 lic catalyst, structure, chemical behavior, triethylaluminum, vana-
 dium acetylacetonate, triethylaluminum vanadium acetylacetonate
 catalyst, tetravalent vanadium, divalent vanadium, magnetic suscepti-
 bility, EPR spectrum, magnetic moment, g-factor

ABSTRACT: The structure and the chemical nature of the active cen-
 ters of the acetylene polymerization catalyst complex formed by
 reaction of triethylaluminum with vanadium acetylacetonate were
 examined. The catalyst, prepared by mixing $VC_{10}H_7O_5$ with a four-
 fold excess of $Al(C_2H_5)_3$ in benzene at room temperature, appeared
 homogeneous. It was proposed that the formation of the active cata-
 lytic complex took place according to the reaction shown in the

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ACCESSION NR: AP4045800

enclosure in which the tetravalent vanadium was reduced to the divalent. The magnetic susceptibility and the EPR spectra of the vanadium acetylacetonate and of the complex were examined. The magnetic moment for VC_2O_4 , determined from the reverse molar magnetic susceptibility-temperature (120-300K range) relationship, was 1.67 ; for the complex, 3.83 . Similar values for magnetic moment were calculated from g-factors obtained from EPR spectral data, confirming divalency of the vanadium in the complex. Orig. art. has: 3 figures and 2 equations.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A.V. Topchiyeva Akademii nauk SSSR (Institute of Petrochemical Synthesis Academy of Sciences SSSR)

SUBMITTED: 27Jan64

ENCL: 01

SUB CODE: GC

NR REF SOV: 002

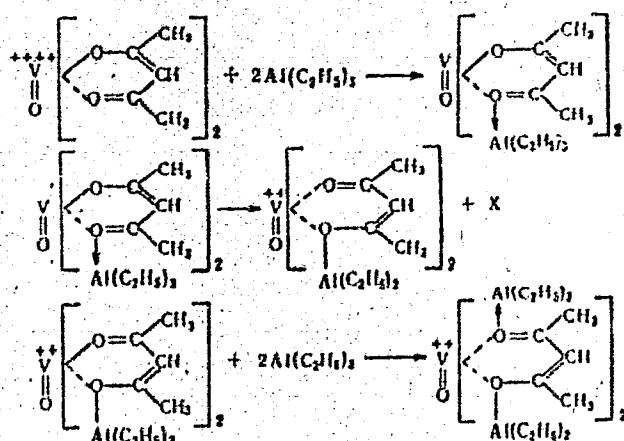
OTHER: 004

Card 2/3

16044-65
ACCESSION NR:

AP4045800

ENCLOSURE: 01 0



Card 3/3

ACCESSION NR: AP4024402

S/0204/64/004/001/0043/0052

AUTHORS: Stetskaya, L.L.; Leshcheva, I.F.; Krentsel', B.A.

TITLE: Investigation of the ethylene polymerization reaction in the presence of the soluble catalyst system $\text{Sn}(\text{C}_2\text{H}_5)_4 - \text{AlEt}_3 - \text{VOCl}_3$

SOURCE: Neftekhimiya, v. 4, no. 1, 1964, 43-52

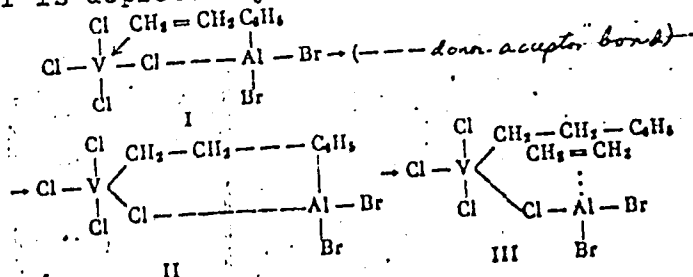
TOPIC TAGS: ethylene, polymerization, polymerization catalyst, Ziegler catalyst, soluble catalyst system, vanadium containing catalyst system, catalyst mechanism, polyethylene, catalyst component ratio, linear polymer, crystalline polymer, crystalline polyethylene, molecular weight distribution, electron microscope, polyethylene monocrystal, propylene polymerization, vanadium tetrachloride containing catalyst, tin tetraphenyl containing catalyst

ABSTRACT: The polymerization of ethylene in the presence of the soluble catalyst system was investigated to explain the mechanism of the catalyst action and the characteristics of the polymer obtained. Examination of the catalyst component ratios indicated that a 1:1 ratio of $\text{AlX}_3:\text{Sn}(\text{C}_2\text{H}_5)_4$ results in a practically inactive catalyst;

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ACCESSION NR: AP4024402

its activity increases up to a 2:1 ratio and remains fairly constant thereafter. Interaction between these components is depicted by:
 $\text{Sn}(\text{C}_6\text{H}_5)_4 + 3\text{AlBr}_2 \longrightarrow 2\text{AlC}_6\text{H}_5\text{Br}_2 + \text{Sn}(\text{C}_6\text{H}_5)_2\text{Br}_2 + \text{AlBr}_3$, where AlBr_3 in excess of 2 moles remains unreacted. Very small amounts of VCl_4 are required since an excess causes dearylation of the aluminum-organic complex. With 1.2×10^{-7} millimoles VCl_4 a 25% yield of high viscosity (2.80) polyethylene is obtained; with 0.03 millimoles the yield is similar but the viscosity of the material has dropped to 1.30; and with 0.06 millimoles the yield suddenly drops to 5%, and the viscosity to 1.10. The second stage of forming the active catalyst complex between $\text{AlC}_6\text{H}_5\text{Br}_2$ and VCl_4 , which appears to require the presence of monomer is depicted by:



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ACCESSION NR: AP4024402

An investigation of the properties of the obtained polyethylene shows it is strictly linear, has a high degree of crystallinity, a high fusion temperature and very narrow molecular weight distribution. An electron microscope study of the supermolecular structure disclosed the presence of monocrystals in unfractionated polyethylene, confirming that groups of polymeric chains are uniform not only in structure but in the size of the structural units. By comparing the properties of polyethylene obtained with dissolved catalyst systems (i.e., the system discussed and said system with $TiCl_4$), and the conventional heterogeneous Ziegler catalyst and the latter containing the transition metal salt VCl_4 , led to the conclusion that the chemical structure of the polyethylene macromolecule is not determined by the solubility of the polymerization catalyst but by the nature of the active growth center of the polymeric chain. Polymerization of propylene was unsuccessful under the various conditions favorable to ethylene polymerization. "Spectra were taken in collaboration with the laboratory of L. S. Polak in the Institute of Nuclear Physics, MGU". "Electron microscope investigations at electron

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ACCESSION NR: AP4024402

optical magnifications from 2000x to 30000x were conducted at the Karpova Physico-Chemical Institute by M. V. Konstantinopol'sk, to whom the authors express thanks." Orig. art. has: 5 figures, 4 tables and 3 equations.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR im. A. V. Topchiyeva (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 09Jul63

DATE ACQ: 17Apr64

ENCL: 00

SUB CODE: CH

NR REF SOV: 008

OTHER: 003

Card 4/4

L 111482-65 EWT(m)/EPF(c)/EMP(j)/T Pc-l/Pr-l RM

ACCESSION NR: AP4047686

S/0204/64/004/005/0741/0746

AUTHOR: Dal', V. V. ; Krentsel', B. A.

TITLE: Polymerization of 1-hexene and 1-pentene in the presence of the catalytic system isobutylaluminum + TiCl₄

SOURCE: Neftekhimiya, v. 4, no. 5, 1964, 741-746

TOPIC TAGS: hexene, pentene, isobutyl aluminum, titanium tetrachloride, polymerization polyhexene, polypentene

ABSTRACT: The polymerization of 1-hexene and 1-pentene (at 20-100C) was investigated with varying molar ratios of a complex organometallic catalyst system based on $Al(iso-C_4H_9)_3$ and $TiCl_4$, and the main regularities of the reaction were established. The best conversion of monomer (70-80%) and a high viscosity of the polymer (2.1-2.4 dl/g in decalin at 90C) were obtained at $AlR_3:TiCl_4=2$ and a temperature of 20C. The resulting polymer was a semi-solid, rubbery substance. X-ray analysis showed that polyhexene and polyheptene, which are amorphous at room temperature, are partly crystallized on cooling to the temperature of liquid nitrogen. Fractional distillation of polyhexene and polyheptene showed that all fractions of the polymer are amorphous substances in a broad range of molecular

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L 14482-65

ACCESSION NR: AP4047686

weights, since crystalline formations plasticized by amorphous parts could not be detected. From the results of fractionation studies, distribution curves of integral and differential molecular weight were plotted. The character of the differential distribution curves shows the high polydispersity of both polymers, while the maxima of the curves were obtained at low values of \bar{M}_w (0.17 for polypentene and 0.75 for polyhexene), i.e. both polymers contained mostly low-molecular weight substances. Polyhexene and polypentene are the last polymers in the homologous series of 1-polyolefins, in which the spiral configuration of the macromolecule is retained. They are an intermediate form between two types of crystallization: crystallization in the spiral form for polyolefins ranging from polypropylene to polypentene, and the crystallization of higher paraffins, such as for polyolefins starting from polynonene. Because of their intermediate position, polyhexene and polyheptene also differ in their properties from the other members of the series. Some hypothetical causes for the formation of only amorphous polymer and 1-hexene and 1-pentene are advanced. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchieva AN SSSR
(Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 02Apr64

ENCL: 00

SUB CODE: OC

NO REF SOV: 001

OTHER: 005

Card 2/2

ACCESSION NR: AP4009151

S/0190/64/006/001/0086/0088
AUTHORS: Ayrapetyants, A. V.; Voytenko, H. M.; Davy*dov, B. E.; Krentsel', B. A.;
Serebryanikov, V. S.

TITLE: Effect of orientation on electrical properties of thermally treated
polyacrylonitrile

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 1, 1964, 86-88 and top
half of insert between p. 86 & 87

TOPIC TAGS: polyacrylonitrile, fiber orientation, conductivity, activation energy,
current carrier

ABSTRACT: The effect of thermally treated fiber orientation on the electrical
properties of polyacrylonitrile has been investigated and data recorded as x-ray
photographs. The specific resistance was measured by sounding probe techniques
for these specimens which were heat-treated at 510, 620, and 700C respectively.
The conditions of thermal treatment being the same, polyacrylonitrile fibers of
greater orientation showed a greater conductivity. The activation energy was
found to be independent of the degree of orientation. It may be assumed that the

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ACCESSION NR: AP4009151

electroconductivity increases because of a possible decrease in number of inter-molecular barriers and an increase in mobility of current carriers. Orig. art. has: 3 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis)

SUBMITTED: 07Aug62

SUB CODE: PH

DATE ACQ: 10Feb64

NO REF SOV: 003

ENCL: 00

OTHER: 001

Card 2/2

ACCESSION NR: AP4042795

S/0020/64/157/003/0611/0614

AUTHOR: Davy*dov, B. E.; Korshak, Yu. V.; Krentsel', B. A.

TITLE: Hydrazinolysis — a new method for the study of the structure of nitrogen-containing polymers with conjugated bonds

SOURCE: AN SSSR. Doklady*, v. 157, no. 3, 1964, 611-614

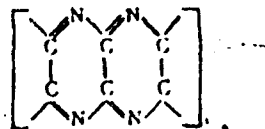
TOPIC TAGS: polyconjugated system, C = N bond, C = C bond, hydrazinolysis, hydrazine hydrate, polymer structure, conjugated bond, polyazine, polyquinoline, polypyridine, paracyanogen, acrylonitrile, polymeric Schiff base

ABSTRACT: Study of the structure of polyconjugated systems with C = N and C = C bonds is difficult, owing to the impossibility of evaluating the C = N:C = C ratio from IR spectra and to the insolubility and infusibility of most compounds of the above systems. For these systems, study methods involving the breaking of polyconjugated bonds and subsequent identification of low-molecular products formed must be applied. Methods which permit a selective breaking of C = N bonds without affecting the C = C bonds in aliphatic and aromatic chains are of special interest. The reaction of "hydrazinolysis,"

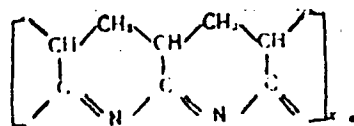
Card 1/3

ACCESSION NR: AP4042795

Involving treatment of polymers at 100C with an excess of hydrazine hydrate in argon, has been developed as a method for studying the structure of N-containing polymers with conjugated bonds. This reaction was applied to polyazines, polymeric Schiff's bases, polyquinoline, polypyridine, paracyanogen



and heat-treated acrylonitrile



It was shown that hydrazine is a specific agent which breaks the C = N bonds with the formation of low-molecular products, i.e., fragments of the polymer chain, such as dihydrazones and amines in the case of polyazines and polymers of Schiff's bases. The degree of hydrazinolysis depends on the structure of the initial polymer; the reaction

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ACCESSION NR: AP4042795

proceeds more readily when the polymer is at least partially soluble in the reaction medium. It is concluded that the reaction of hydrazinolysis can be applied as a new method for establishing the structure of polyconjugated systems with C = N bonds.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 06Feb64

ATD PRESS: 3067

ENCL: 00

SUB CODE: GC, OC

NO REF SOV: 006

OTHER: 003

Card 3/3

GEYDERIKH, M.A.; DAVYDOV, B.E.; KRENTSEL', B.A.

Thermal conversion of polyacrylonitrile. Izv. AN SSSR, Ser. khim.
no.4:636-643 '65. (MIRA 18:5)

1. Institut neftekhimicheskogo sinteza im. A.V.Topchiyeva AN SSSR.

L 58498-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/ENP(j)/T/ETA(c) PC-4/Pr-4/FS-4/Pt-7
Wm/RTI

ACCESSION NR: AP5014808

UR/0030/65/000/005/0103/0106

AUTHOR: Krentsel', B. A. (Doctor of chemical sciences)

TITLE: New polymers; 15th Conference on High-Molecular-Weight-Compounds

SOURCE: AN SSSR. Vestnik, no. 5, 1965, 103-106

TOPIC TAGS: chemical conference, polymer, macromolecular chemistry

ABSTRACT: The Fifteenth Conference on High-Molecular-Weight Compounds was held in Moscow from 25 to 28 January 1965. Some 1000 specialists from various parts of the Soviet Union participated. Ten introductory presentations were given on the main trends of polymer investigation, and over 150 papers were heard which dealt with the synthesis of new polymers and modification of known polymers. Exploitation of the expanding range of monomers and radically new synthetic methods was found to be the primary aim of recent research.

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L 58498-65

ACCESSION NR: AP5014808

Significant efforts have been directed toward creating polymers with improved thermal stability combined with desirable mechanical properties. Heteroorganic substances appear to hold the greatest promise in this respect.

N. S. Nametkin reported on a new method of polymerization involving ring opening of such compounds as 1,1,3,3-tetrasubstituted disilicacyclobutanes and formation of high-molecular-weight silyl-methylene polymers. Such compounds may be regarded as polyolefins whose main chain contains regularly spaced silicon atoms.

In searching for purely organic heat-resistant polymers, particular attention is being given to polymers incorporating oxazole and imidazole rings in the main chain. M. M. Koton obtained a series of heat-resistant polymers containing benzimidazole and benzophosphoimidazole links in the main chain of the polymer.

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L 58198-65

ACCESSION NR: AP5014803

There were no reports devoted to the synthesis of inorganic polymers, in spite of the fact that these substances show a number of desirable properties, including high thermal stability.

Among the reports dealing with studies and applications of polyconjugated systems, A. A. Berlin's data on the activation effect of paramagnetic particles of polymers containing polyconjugated systems on the reactivity of compounds with π -bonding (local activation effect) was of great interest. Paramagnetic particles are formed by quasi-radical polymerization during the synthesis of these compounds. The presence of paramagnetic particles exerts a strong influence on the physical properties of such polymer systems. It is expected that polymers of this type will find broad application as thermo-oxidative stabilizers and catalysts for redox and other reactions. Among communications dealing with the synthesis of polyconjugated systems, it was reported that onium polymerization of γ -chloromethylpyridine leads to the formation of a new type of polymer in which the chain of conjugation contains atoms with formal charges.

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ACCESSION NR: AP5014808

In his introductory paper devoted to the modification of polymers, N. A. Plate commented that the main feature of graft and block copolymers is the summation of the properties of the components rather than their averaging.

It was felt that a substantial shortcoming of the conference was the absence of any papers dealing with stereoblock copolymers. These are of special interest among block copolymers, since they combine both chemical and configurational inhomogeneity. This makes it possible to obtain different polymers from the same starting materials. Soviet research in this area was found to lag behind that in the United States; extensive studies in this field will soon be initiated in the Soviet Union.

Many other topics were dealt with in the numerous papers presented at the conference. The opinion was expressed that, in the future, large conferences should be held no more often than every three or four years, with leading scientists presenting extensive review papers.

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L 58498-65
ACCESSION NR: AP5014808

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: 00, 00

NR REF SOV: 000

OTHER: 000

FSB v. 1, no. 8

Card 5/5

L 27400-65 EWT(m)/EPP(c)/EPP(n)-2/ENG(m)/EPR/ENP(j)/T Pc-L/Pr-L/Pa-L/Pu-L
RPL RWH/WW/GG/RH

ACCESSION NR: AP5006082

S/0204/65/005/001/0090/0096

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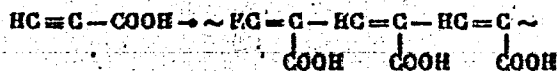
AUTHOR: Khutareva, G. V.; Krentsel', B. A.; Shishkina, M. V.; Davydov, B. E.

TITLE: Polymerization of acetylenecarboxylic acid⁷ in the liquid and solid phases

SOURCE: Neftekhimiya, v. 5, no. 1, 1965, 90-96

TOPIC TAGS: acetylenecarboxylic acid, polymerization, radiation induced polymerization, organic semiconductor, semiconducting polymer

ABSTRACT: A study has been made of the thermal, photo,⁷ and radiation-induced polymerization of acetylenecarboxylic acid in the liquid or solid phase, or in solution:



The effect of polymerization conditions on the occurrence of the side reactions of dehydration and decarboxylation was determined. It was found that radiation-induced polymerization is a good preparative method whereby side reactions are mini-

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ACCESSION NR: AP5006082

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mized. In radiation-induced polymerization, the product is a dark solid, soluble in water, ethanol, and acetone up to degrees of conversion of the order of 33%; it is radiation resistant, but it is decarboxylated to form insoluble products by light in aqueous media and by heat. The polymer gives an EPR signal and is a high-ohmic semiconductor ($\rho_{20} = 0.6 \times 10^{-14} \text{ ohm}^{-1} \text{ cm}^{-1}$). This work was done in view of the interest in a polymer which combines the properties of a conjugated system and those of a stiff-backbone polymeric electrolyte and which can be chemically modified. Orig. art. has: 5 figures, 2 tables, and 1 formula. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva AN SSSR (Institute of Petrochemical Synthesis, AN SSSR).

SUBMITTED: 26Jun64

ENCLOSURE: 00

SUB CODE: OC, GC

NO REF SOV: 000

OTHER: 003

ATD PRESS: 3192

Card 2/2

NASIROV, F.M.; KRENTSEL', B.A.; DAVYDOV, B.E.

Acetylene polymerization process with a soluble catalytic system based on $AlEt_3$ and $VO(acetyl\ acetonate)_2$. Izv. AN SSSR. Ser. khim. no.6:1009-1016 '65.

(MIRA 18:6)

1. Institut neftekhimicheskogo sinteza imeni Topchiyeva AN SSSR.

VASILENOK, Yu.I.; DAVYLOV, B.E.; KRENTSEL', B.A.; SAKHIN, B.I.

Donor-acceptor interaction of halogens with polystyrene, polyvinyltoluene, and copolymers of styrene with α -methylstyrene and β -vinylnaphthalene. Vysokom. soed. 7 no.4: 626-633 Ap 65. (MIRA 18:6)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut polimerizatsionnykh plastmass.

L 50548-65 EWT(1)/EPA(m)-2/EWT(m)/EPF(c)/EMP(j)/T/EWA(h) Pz-6/Pc-4/Pr-4/
Pt-7/Pch IJP(c) AT/RM UR/0190/65/007/005/0835/0842
ACCESSION NR: AP501355

AUTHOR: Popov, Yu. A.; Davydov, B. E.; Kubasova, N. A.; Krentsel', B. A.;
Konstantinov, I. I.

TITLE: Synthesis and properties of polymeric Schiff bases 1

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 5, 1965, 835-842

TOPIC TAGS: organic semiconductor²¹, semiconducting polymer, polymeric Schiff base,
electrical property

ABSTRACT: Ten new polymeric Schiff bases have been synthesized and their chemical structure, morphology, and principal properties have been studied (see Table 1 of the Enclosure). The synthesis involved the polycondensation of p-phenylenediamine or 2,6-diaminopyridine with various dicarboxylic compounds in glacial acetic acid under mild conditions which substantially prevented side reactions. The polymers were yellow to black materials, in some cases infusible up to 400C, showing high-ohmic semiconductor properties. For the polymeric Schiff bases which are continuously conjugated, the activation energy for conduction was 1.7—2.6 ev, and for those in which conjugation was disrupted by hetero atoms and -CH₂- groups, this energy was 3.1—3.6 ev. Pyrolysis of the polymers at 150—500C under vacuum was

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L 50548-65

ACCESSION NR: AP5013057

studied and hypotheses as to the chemical reactions causing changes in electrical properties (tabulated in the source) were advanced. In the 400—500C range, these changes were attributed to molecular rearrangement to form three-dimensional conjugated systems. EPR spectroscopy showed that all the polymers gave a narrow signal (7×10^{14} — 1×10^{18} spin/g). A substantial effect of oxygen adsorption on electrical properties was demonstrated, usually consisting in a drop in electrical conductivity and a rise in activation energy. Orig. art. has: 2 figures, 2 tables, and 1 formula. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 01Jul64

ENCL: 02

SUB CODE: 0,GC

NO REF SOV: 007

OTHER: 003

ATD PRESS: 4007

Card 2/4

L 50548-65

ACCESSION NR: AP5013057

ENCLOSURE: Q1 0

Table 1. Some properties of polymeric Schiff bases

	Formula	Color	Yield, %	Viscosity of polycondensation	Red. vis. from sol. in CHCl ₃	Red. vis. from sol. in CHCl ₃ after 10 min. in CHCl ₃	Crystallizing	η_{sp}/c , dl/g	η_{sp}/c , dl/g	EPR signal, spin/g
I	$O-[CH-CH=N-C_6H_4-N]_n-CH-CHO$	dark brown	45.00	2	320	—	amorphous	2.0	$7.2 \cdot 10^{-4}$	$2 \cdot 10^4$
II	$O-[CH-CH=N-C_6H_3(N)-N]_n-CH-CHO$	same	35.00	2	442	802	same	2.0	$2.7 \cdot 10^{-4}$	$1.5 \cdot 10^4$
III	$O-[C(CH_2CH_3)-C=N-C_6H_4-N]_n-C(CH_2CH_3)-C=O$	" "	37.00	2	502	1000	" "	2.0	$2.5 \cdot 10^{-4}$	$1.6 \cdot 10^4$
IV	$O-[C(CH_2CH_3)-C=N-C_6H_3(N)-N]_n-C(CH_2CH_3)-C=O$	grey	37.00	2	532	1330	" "	2.5	$1.2 \cdot 10^{-4}$	$1.7 \cdot 10^4$
V	$O-[C(CH_2CH_3)-C=N-C_6H_4-N]_n-NH_2$	yellow	35.00	2	1085	1190	crystalline, m.p. 113-114°C	2.4	$1.2 \cdot 10^{-4}$	$2.5 \cdot 10^4$
VI	$O-[C(CH_2CH_3)-C=N-C_6H_3(N)-N]_n-NH_2$	same	37.00	2	880	880	crystalline	2.0	$6 \cdot 10^{-4}$	$1.1 \cdot 10^4$
VII	$O-[CH-CH-CH-CH=N-C_6H_4-N]_n-CH-CH-CH-CHO$	dark brown	35.00	2	405	—	amorphous	1.7	$2.5 \cdot 10^{-4}$	$1.6 \cdot 10^4$

Card 3/4

L 50548-65

ACCESSION NR: AP5013057

ENCLOSURE: 02

Table 1. Some properties of polymeric Schiff bases (Cont.)

	Formula	Color	Yield, %	Viscosity of 1% solution in CHCl ₃	Wt. group from nitrogen	Wt. by nitrogen	Crystal- lizing	Δε, cm ⁻¹	Δε, cm ⁻¹	IR sig- nal, cm ⁻¹
VIII		black	27.00	6	1060	1085	same	1.7	1.8 · 10 ⁻²	1 · 10 ⁴
IX		yellow	46.00	5	680	—	crystalline	1.0	7.8 · 10 ⁻²	1.4 · 10 ⁴
X		same	36.00	5	600	—	amorphous	1.1	1.8 · 10 ⁻²	1.2 · 10 ⁴
XI		violet	29.00	2	1000	1100	crystalline m.p. 165-166°C	1.0	1.8 · 10 ⁻²	1.2 · 10 ⁴
XII		grey	19.00	1	680	770	same, m.p. 115-117°C	1.0	1.8 · 10 ⁻²	1.4 · 10 ⁴
XIII		brown	10.00	1	1100	670	amorphous	1.1	1.8 · 10 ⁻²	7 · 10 ³

ml
Card 4/4

ALIYEV, A.D.; KRENTSEL', B.A.; FEDOTOVA, T.N.

Asymmetrical polymerization of trans-1-phenyl-1,3-butadiene.
Vysokom. soed. 7 no.8:1442-1446 Ag '65. (MIRA 18:9)

1. Institut neftekhimicheskogo sinteza imeni A.V.Topchiyeva AN SSSR.

AMERIK, V.V.; KRENTSEL', B.A.

Some regularities in the polymerization of bifunctional monomers.
Usp.khim. 34 no.4:653-665 Ap '65. (MIRA 18:8)

1. Institut neftekhimicheskogo sinteza imeni A.V.Topchiyeva, AN
SSSR.

KRENTSEL, B.A., doktor khim. nauk

New polymeric materials; 15th conference on macromolecular
compounds. Vest. AN SSSR 35 no.5:103-106 My '65.

(MIRA 18:6)

L 29134-65 EPA(s)-2/EnT(m)/EPF(c)/ERP(j)/Y Pc-4/Pr-4/Pt-10 RM

ACCESSION NR: AP5005899

8/0020/65/160/003/0650/0653

AUTHOR: Davydov, B. E.; Zakharyan, R. Z.; Karpacheva, G. P.; Krentsel', B. A.;
Lapitskiy, G. A.; Khutareva, G. V.

TITLE: Impairment of coplanarity and conjugation in crystallizing polymers

SOURCE: AM SSSR. Doklady, v. 160, no. 3, 1965, 650-653

TOPIC TAGS: crystallization, conjugation, conjugated polymer, organic semiconductor,
semiconducting polymer, coplanarity

ABSTRACT: A study has been made to determine to what extent crystallization gives rise to conjugation disruption due to impairment of coplanarity in conjugated polymers in the solid phase, and how it affects their optical, paramagnetic, and semiconducting properties. These properties were compared for 32 polyazines and polymeric Schiff bases. It was found that the properties which are typical of conjugated polymers are exhibited to a greater extent by amorphous than by crystalline polymers. Thus, in color, in IR spectra, and in the absence of EPR, crystalline polyazines are similar to their analogs containing O, S, CH₃, or OCH₃ groups between conjugated segments in the backbone. A similar correlation, but less marked, was in evidence for the polymeric Schiff bases. This effect of crystallinity on con-

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L 29134-65

ACCESSION NR: AP5005899

jugated-polymer properties was attributed to the impairment of coplanarity during crystallization. In thermal stability and activation energy for conduction, however, the crystalline polymers were closer to the amorphous ones. The effect of crystallinity on semiconducting properties was interpreted as being determined in each individual case by changes in activation energy due to two competing processes occurring on crystallization: an increase in carrier mobility and a decrease in carrier concentration. Orig. art. has: 1 table. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza imeni A. V. Topchiyeva Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences, SSSR)

SUBMITTED: 30Jun64

ENCL: 00

SUB CODE: 55,00

NO REF SOV: 000

OTHER: 000

ATD PRESS: 3197

Card 2/2

L 38563-65
RWH/RW/RM

ENT(m)/EPF(c)/EPH/EMP(j)/T/EWA(c) Pc-l/Pr-l/Ps-l/P1-l RPL

ACCESSION NR: AP5010171

UR/0020/65/161/002/0399/0402

AUTHOR: Khutareva, G. V.; Brin, G. P.; Davydov, B. E.; Krentsel', B. A.;
Krasnovskiy, A. A. (Corresponding member AN SSSR)

48
39
B

TITLE: Photosensitizing properties of polyconjugated organic polymers 7

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 399-402

TOPIC TAGS: photosensitization, conjugated double bond system, polyconjugated polymer, ascorbic acid, oxidation, polyacronitrile, Schiff's base, polynitrile, polyquinoline

ABSTRACT: This study investigates the photosensitizing effect of polymers with a system of conjugated double bonds on the oxidation of ascorbic acid. The study was prompted by the fact that photosensitization was established for some crystalline organic dyes and phthalocyanines (semiconducting substances with conjugated bonds). The Warburg-Barcroft micromanometric method was applied to trace the kinetics of the reaction. The reaction was conducted in aqueous ascorbic acid solution in the presence of finely powdered polymers under red light (wavelength more than 600 mμ), white light of an incandescent bulb, or UV light (mercury 365-mμ band). The following polymers were used: thermally treated polyacronitrile, heat-polymerized

Card 1/3

15

L 38563-65

ACCESSION NR: AP5010171

4
quinoline, polypropionic acid, polymeric Schiff's bases, polyazines and polynitriles. All of these polymers were insoluble, colored solids with absorption maxima in UV and were p-type semiconductors in the air. They could be divided into two groups with respect to their catalytic effect on the oxidation of ascorbic acid: 1) photosensitizing polymers, such as heat-treated polyacronitrile, polyquinolines, polypropionic acid, and poly-Schiff's bases, all of which promoted the photooxidation of ascorbic acid, which is not oxidized without catalyst; 2) catalysts in the dark: polynitriles and paracyanogen, the catalytic effect of which in general was inhibited by illumination in the sequence UV light > white light > red light. The following observations were made on the photosensitizing effect of the heat-treated polyacronitrile: 1) the presence of carbonized structures was not essential for the effect, since one of the most carbonized specimens displayed a very weak photosensitizing effect in the UV light and none under the white light; 2) the presence or absence of cross links was of no special influence, since polyacronitrile, heat treated in solution (which precluded the formation of cross links), displayed a rather high photosensitizing effect. Further investigation of the mechanism of the effect is being continued. Orig. art. has: 2 figures and 4 tables. [BN]

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva (Institute of Petrochemical Synthesis); Institut biokhimi im. A. N. Bakha Akademii nauk (Institute of Biochemistry, Academy of Sciences)

Card 2/3

L 38563-65

ACCESSION NR: AP5010171

SUBMITTED: 21Oct64

NO REF SOV: 006

ENCL: 00

OTHER: 000

SUB CODE: 00, 0P

ATD PRESS: 3225

Card 3/3

63723-52 EWT(m)/EPF(2)/ENP(1)/T RFL RM/RM UR/0020/65/162/002/0364/0365
 44,55 34
 31
 0
 ACCESSION NR: AP5013756
 AUTHOR: Amerik, Yu.B.; Krentsel', B.A.; Shishkina, M. V. 44,55
 TITLE: Effect of the application of strong electrostatic fields in the course of the polymerization of methyl methacrylate on the structure of the polymer formed 44,55
 SOURCE: AN SSSR. Doklady, v. 162, no. 2, 1965, 364-365
 TOPIC TAGS: polymethylmethacrylate, polymer structure, polymerization, electrostatics, polymer
 ABSTRACT: In a recent article, Yu. B. Amerik, B. A. Krentsel', and M. V. Shishkina briefly review several non-Soviet studies on the preparation of poly(methyl methacrylate) (PMMA) mainly of predetermined structures (syndiotactic, isotactic, isotactic-syndiotactic block copolymers).
 The authors question the conclusion of F. A. Bovey* that there is no difference between the activation entropies for syndiotactic and isotactic monomer placement and that this placement is solely determined by the
 Card 1/5

L 63783-65

ACCESSION NR: AP5013756

difference in the activation enthalpies for propagation of these structures. To demonstrate the role of activation entropy in the structural formation of PMMA, methyl methacrylate (MMA) was polymerized in bulk and in toluene solution in strong electrostatic fields (10^4 — 10^5 v/cm) in special reactors. Benzoyl peroxide (1 mol%) was used as initiator. The structure of PMMA formed was determined from its glass temperature (T_g) and from the values of an arbitrary parameter J. Calculations of J-values were based on equations provided by W. E. Goode** and calculated from IR spectra. Polymerization conditions and values for T_g and J obtained in electrostatic fields with different intensities are given in Table 1.

Comparison of these data with the T_g and J values given by Goode in Table 2 below indicates that: 1) polymerization in strong electrostatic fields yields PMMA with an increased percentage of syndiotactic structure; and 2) electrostatic fields affect the structure of PMMA to a lesser degree in toluene solution than in bulk.

Card 2/5

L 63783-65

ACCESSION NR: AP5013756

Table 1. Polymerization conditions and values

Polymerization temperature, °C	Field intensity, v/cm	Glass temperature, °C	Infrared J value
Bulk polymerization			
50	0.0	106	101
50	0.0	106	97
50	2.0×10^4	110	107
50	2.5×10^4	111	106
50	4.0×10^4	113	112
Solution polymerization			
50	0.0	108	103
50	0.0	107	103
50	6.0×10^4	112	106
50	6.0×10^4	112	107
40	7.0×10^4	113	109

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L 63783-65

ACCESSION NR: AP5013756

Table 2. Properties of amorphous polymers of methyl methacrylate

Type	Suggested chain configuration	Glass temp., °C	Density at 30°C, g/ml	Infrared J value
I	Syndiotactic	115	1.19	100—115
II	Isotactic	45	1.22	25—35
III	Isotactic-syndiotactic	60—95	1.20—1.22	40—80
Conventional	Essentially random	104	1.188	95—100

Strong electrostatic fields affect not only the polymer structure but also the MMA polymerization kinetics and the molecular weight of the polymer. The authors state that MMA polymerization in stronger electrostatic fields will yield PMMA specimens with a predominantly syndiotactic structure.

Card 4/5

L 63783-65

ACCESSION NR: AP5013756

3

* Bovey, F. A. Polymer MSR spectroscopy. III. The rates of the propagation steps in the isotactic and syndiotactic polymerization of methyl methacrylate. Journal of polymer science, v. 46, 1960, 59-64.

** Goode, W. E., F. H. Owens, R. P. Fellmann, W. H. Snyder, and J. E. Moore. Crystalline acrylic polymers. I. Stereospecific anionic polymerization of methyl methacrylate. Journal of polymer science, v. 46, 1960, 317-331.

Orig. art. has: 2 formulas, 2 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A.B. Topchiyeva Akademii nauk SSSR (Institute of Petro-Chemical Synthesis, Academy of Sciences SSSR)

44,56

SUBMITTED: 03Nov64

ENCL: 00

SUB CODE: MT,GC

NR REF SOV: 000

OTHER: 006

FEB v.1, no.9

Card 5/5

L 21143-66 EBT(m)/EMP(j)/T/EMA(h)/EMA(1) TM
ACC NR: AP6003503

SOURCE CODE: UR/0364/66/002/001/0117/0122,3

AUTHOR: Silin', E. A.; Motorykina, V. P.; Shmit, I. K.; Gcyderikh, M. A.; Davydov,
B. E.; Krentsel', B. A.

ORG: Latvian State University (Latviyskiy gosudarstvennyy universitet); Institute
of Petrochemical Synthesis, Academy of Sciences SSSR (Institut neftekhimicheskogo
sinteza Akademii nauk SSSR)

TITLE: Structural changes in polyacrylonitrile during infrared irradiation¹⁵

SOURCE: Elektrokimiya, v. 2, no. 1, 1966, 117-122

TOPIC TAGS: polyacrylonitrile, IR absorption spectrum, electron spectrum

ABSTRACT: The purpose of this investigation was to study the effect of intense radiation on polyacrylonitrile. The selective interaction of radiation on the vibrational energy of individual groups of polyacrylonitrile molecules was assumed. The use of a concentrated IR beam was used to obtain a polyacrylonitrile film with treated sections of a given geometric configuration and degree of conversion. Polyacrylonitrile film was obtained by redox initiation with an average molecular

Card 1/3

UDC: 621.315.592 : 547

L 21143-66
ACC NR: AP6003503

weight of 23000-36000. The films were prepared from 3% polyacrylonitrile solution in dimethylformamide and kept in vacuum to a constant weight. The film thickness was 8-12 microns. The films were irradiated in 10^{-5} - 10^{-6} mm pressure chamber through a quartz window about 100 mm from the light source. The spectra of irradiated samples were obtained in air at room temperature. Electronic absorption spectra were taken on an SF-4 spectrophotometer and vibrational spectra were taken on an IKS-14 spectrophotometer. It was found that infrared irradiation produces significant changes in the vibrational absorption spectra of polyacrylonitrile. The IR irradiation increases the mobility of hydrogen in tertiary carbon and facilitates its migration to the nitrile group, $>C=NH$, which, in turn, produces intermolecular cross-linking. The hydrogen bond is formed between the $>C=NH$ group and the neighboring nitrile group. This scheme is supported by the appearance of the diffuse absorption band, shifted toward the 3.45 cm^{-1} region, which is assigned to the valence vibrations of the $>N-H...N\equiv C$ -group. Electronic spectra also indicate the formation of polyunsaturated bonds. The comparison of the vibration absorption spectra of polyacrylonitrile upon thermal treatment with those of the same material irradiated with IR show that both in their initial and subsequent stages, the conversion process during IR irradiation differs from the conversions which take place during thermal treatment. Conversion of polyacrylonitrile during IR irradiation

Card 2/3

L 21143-66
ACC NR: AP6003503

weight of 23000-36000. The films were prepared from 3% polyacrylonitrile solution in dimethylformamide and kept in vacuum to a constant weight. The film thickness was 8-12 microns. The films were irradiated in 10^{-5} - 10^{-6} mm pressure chamber through a quartz window about 100 mm from the light source. The spectra of irradiated samples were obtained in air at room temperature. Electronic absorption spectra were taken on an SF-4 spectrophotometer and vibrational spectra were taken on an IKS-14 spectrophotometer. It was found that infrared irradiation produces significant changes in the vibrational absorption spectra of polyacrylonitrile. The IR irradiation increases the mobility of hydrogen in tertiary carbon and facilitates its migration to the nitrile group, $>C=NH$, which, in turn, produces intermolecular cross-linking. The hydrogen band is formed between the $>C=NH$ group and the neighboring nitrile group. This scheme is supported by the appearance of the diffuse absorption band, shifted toward the 3.45 cm^{-1} region, which is assigned to the valence vibrations of the $>N-H\dots N\equiv C$ -group. Electronic spectra also indicate the formation of polyunsaturated bonds. The comparison of the vibration absorption spectra of polyacrylonitrile upon thermal treatment with those of the same material irradiated with IR show that both in their initial and subsequent stages, the conversion process during IR irradiation differs from the conversions which take place during thermal treatment. Conversion of polyacrylonitrile during IR irradiation

Card 2/3

AMERIK, Yu.B.; KRENTSEL', B.A.; KONSTANTINOV, I.I.

Polymerization of vinyl oleate in the liquid crystal state.
Dokl. AN SSSR 165 no.5:1097-1100 D '65.

(MIRA 19:1)

1. Institut neftekhimicheskogo sinteza im. A.V.Topchiyeva
AN SSSR. Submitted May 3, 1965.

AMERIK, V.V.; KRENTSELI, B.A.

Problem of ion-radical mechanism of polymerization. Izv. AN
SSSR, Ser. khim. no.11:2081-2083 '65. (MIRA 18:11)

1. Institut neftekhimicheskogo sinteza Im. A.V. Topchiyeva
AN USSR.

AMERIK, V.V.; KRENTSEL', B.A.; SHISHKINA, M.V.

Polymerization of crotonaldehyde. Vysokom. speed. 7 no. 10:1713-
1718 C '65. (MIRA 18:11)

1. Institut neftekhimicheskogo sinteza AN SSSR.

POPEV, V.I.; GAVRILOV, B.B.; ZIMANOVA, B.A.; KUMAROV, P.A.; KONSTANTINOV, I.I.

Synthesis and properties of polymeric Schiff bases. Vysshem. soed.
7 no.5:835-842 My '68. (MIRA 18:9)

A. Institut neftekhimicheskogo sinteza AN BSSR.

8871-66 EWT(m)/EWP(j)/T RM

ACC NR: AP5025960

SOURCE CODE: UR/0190/65/007/010/1713/1718

AUTHOR: Amerik, V. V.; Krentsel', B. A.; Shishkina, M. V.

ORG: Institute of Petrochemical Synthesis, AN SSSR (Institut neftekhimicheskogo sinteza AN SSSR)

TITLE: Investigation of the crotonaldehyde polymerization reaction

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 10, 1965, 1713-1718

TOPIC TAGS: aliphatic aldehyde, polymerization, catalytic polymerization, polymerization catalyst, polymerization kinetics, polymer structure

ABSTRACT: The polymerization of crotonaldehyde was investigated to help elucidate the effect of the presence of different substituents on the polymerization of acrolein. Polymerizations were run with an anionic catalyst under nitrogen atmosphere in the -80 to -60°C temperature range. Sodium methoxide and sodium naphthalene complex was shown to be an effective catalyst for polymerization on the carbonyl group. Polymerization temperature significantly affects not only the process kinetics but the structure of the polymer chain. Polymer

Card 1/2

UDC: 66.095.26+678.744

L 8871-66

ACC NR: AP5025960

yield and polymer molecular weight increased with reduction of temperature to -10 to -20° . The content of the free aldehyde group in the polymer decreased while the $\text{CH}_3\text{CH}=\text{CH}-$ side group content increased with reduction of temperature. Maximum yield was obtained with monomer concentration of 3 mol/l. The polymer obtained was predominantly polyacetalic, molecular weight 1,000 to 10,000. The absence of $\text{CH}_3\text{CH}=\text{CH}-\text{O}$ units in the polymer was established by ozonolysis. The effect of solvent on polymer yield and structure are to be studied further. Orig. art. has: 3 equations, 4 tables and 5 figures.

SUB CODE: MT, OC/ SUBM DATE: 10Nov64/ ORIG REF: 001/ OTH REF: 011

Card 2/2

Rel

L 30387-66 EWP(j)/EWT(m)/T IJP(c) RM

ACC NR: AP6019550

SOURCE CODE: UR/0190/66/008/006/1138/1138

AUTHOR: Nasirov, F. M.; Lelyukhina, Yu. L.; Krentsel', B. A.

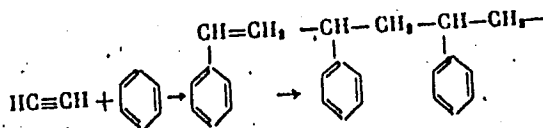
ORG: none

TITLE: Polymerization of acetylene in benzene on the $Al(C_2H_5)Cl_2$ catalyst

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 6, 1966, 1138

TOPIC TAGS: polymerization, acetylene, benzene, polystyrene, POLYMERIZATION CATALYST

ABSTRACT: Polymerization of acetylene in benzene on the $Al(C_2H_5)Cl$ catalyst yielded a white powder which was soluble in chlorinated hydrocarbons and certain other solvents. The product was identified by IR spectroscopy as polystyrene. Measurements of the intrinsic viscosity of the polymer in toluene at 25C indicated that its molecular weight is comparatively low. It is suggested that in the experiment, benzene is vinylated by acetylene to form styrene which is immediately polymerized:



Card 1/2

UDC: 66.095.264+678.76

L 30387-66

ACC NR: AP6019550

Further study of the process and of the properties of polystyrene formed are in progress. Orig. art. has: 1 formula. [B0]

SUB CODE: 07, 11/ SUBM DATE: 13Jan66/ ATD PRESS: 5017

Card 2/2 PC

KRENTSIS, R.P.

SKUPENNIKOV, N.B.; KRENTSIS, R.P.; GEL'D, P.V.

Ustanovka dlya issledovaniya teploobmenniya
tverdykh i zhidkikh splavov.

report submitted for the 5th Physical Chemical Conference on
Steel Production.

MOSCOW — 30 Jan 1968

23616

S/148/60/000/012/001/020
A161/A133

18 8100

1418, [REDACTED]

AUTHORS: Krentsis, R. P.; Gel'd, P. V., and Serebrennikov, N. N.

TITLE: The enthalpy of chromium and some chromium ferroalloys at high temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 12, 1960, 5 - 11

TEXT: Only few data are available on the enthalpies and heat capacities of many ferroalloys at high temperatures, though such data are absolutely necessary for engineering and thermodynamic calculations. The purpose of the subject investigation was to obtain the missing data. Two adiabatic mixing calorimeters of different type were used, a non-sealed for the range from room temperature to 1,000 - 1,200°C and a vacuum type for the high range up to the melting point; the measurement accuracy was 1.2% in the range above 1,300°C, and 0.8% below that, the vacuum unit had already been described by N. N. Serebrennikov, R. P. Krentsis and P. V. Gel'd (Ref. "Zavodskaya laboratoriya", 1960, no. 1, 109). The obtained values were reduced to 0° in experiments with an ice refrigerator. Test results are

Card 1/7

23616

S/148/60/000/012/001/020
A161/A133

The enthalpy of chromium and some chromium...

presented in the included table. The following metals and alloys were studied: aluminothermic Cr of (%) 98.66 Cr; 0.20 Si; 0.43 Al; 0.64 Fe; 0.036 C and 0.007 P; non-carbon ferrochrome - 76.45 Cr; 0.35 Si; 0.14 Al; 0.26 C; 0.008 S; nitrated ferrochrome - 77.75 Cr; 0.52 Si; 0.20 Al; 1.20 N₂; 0.028 C and 0.014 S; an alloy - 63.91 Cr; 18.11 Al; 16.55 Fe; 0.67 Si; 0.024 C and 0.004 S. Empirical equations have been derived determining the enthalpy (ΔH^t) and heat capacity (c_p) with sufficient accuracy (1 - 1.5%) for a wide temperature range (from 273 to 1,873°K). The obtained enthalpy values matched the data of other authors up to 1,100°C, higher on the ΔH and c_p of Cr rose smoothly to 1,600°C without noticeable anomaly in the 1,300 - 1,400° range which might mean the absence of the $\alpha \rightarrow \beta$ transformation in the experiment conditions, or the mixing calorimeters not reflecting the low transformation heat that had been determined by H. A. Martin (Ref. 9: Z. Metallkunde, 49, 1958, 390), or the impurities suppressing the transformation. The heat capacity of Cr at high temperatures considerably exceeded the 5.956 cal/g·atom·degree prescribed by the Dulong-Petit law. It is assumed that the specific enthalpy of alloys should slightly increase with the addition of nitrogen. The temperature effect on the ΔH of both nitrated and

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3/143/60/000, 11, 11/070
A161/A177

The enthalpy of chromium and some chromium...

non-carbon ferrochrome was nearly equal but slightly higher in nitrated ferrochrome, the difference not more than 1 - 2% even at a high temperature range. The enthalpy and heat capacity equations for non-carbon ferrochrome are:

$$\Delta H_{273,1}^{T^{\circ}K} = -18,48 + 0,0787T + 3,869 \cdot 10^{-5} T^2 - 1608 \cdot T^{-1}, \text{ cal/g} \quad (3)$$

and

$$c_p = 0,0787 + 7,738 \cdot 10^{-5} T + 1608 \cdot T^{-2}, \text{ cal/g degree} \quad (4)$$

and for nitrated ferrochrome:

$$\Delta H_{273,1}^{T^{\circ}K} = -21,91 + 0,08352 \cdot T + 3,897 \cdot 10^{-5} \cdot T^2 - 956,5 \cdot T^{-1}, \text{ cal/g} \quad (5)$$

and

$$c_p = 0,08352 + 7,794 \cdot 10^{-5} \cdot T + 956,5 \cdot T^{-2}, \text{ cal/g degree} \quad (6)$$

The Cr-Al-Fe alloy was apparently dependably protected from oxygen by the forming spinel film in the non-sealed calorimeter. In the vacuum unit a slight quantity of argon was added. As may be seen (from the table and the

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S/148/60/000/012/001/020
A161/A133

The enthalpy of chromium and some chromium...

polytherm, Fig. 5), its enthalpy rose abnormally fast in the 720 - 900°C range, which may be due to transformation with β -phase decomposition. The low-temperature branch of the curve for the Cr-Al-Fe alloy (i.e. 273 - 973°K) is described (with an accuracy up to 0.4%) with the interpolation polynomial

$$H_{273.1}^{900} = -27.25 + 0.0982 \cdot T + 4.492 \cdot 10^{-5} \cdot T^2 - 794.5 \cdot T^{-1}, \text{ cal/g} \quad (7)$$

from where

$$c_p = 0.0982 + 8.984 \cdot 10^{-5} \cdot T^2 + 794.5 \cdot T^{-2}, \text{ cal/g} \cdot \text{deg} \quad (8)$$

and for 1,073 - 1,523°K the curve is described linearly:

$$\Delta H_{273.1}^{T^{\circ}K} = -64.6 + 0.203T, \text{ cal/g} \quad (9)$$

where the heat capacity of the alloy is constant and equals 0.203 cal/g·deg. As the equations (7) and (9) do not include the transition range 700 - 800°, it is recommended to extend equation (7) to 1,063°K and introduce a fictitious isothermic transformation (instead of the polythermic at 1,063°K) in which the hatched areas (in Fig. 5) are equal. The transformation heat of-

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S/149/60/000/012/001/020
A161/A133

The enthalpy of chromium and some chromium...

fect at 1,063°K will then amount to about 26.5 cal/g. From 1,250°K on the H, the curve rises abruptly due to melting that ends at 1,550°. The melting point can be roughly determined by extrapolating the H curve of the solid phase, which makes (with 7% accuracy) 130 cal/g. There are 5 figures and 20 references: 10 Soviet-bloc and 10 non-Soviet-bloc. Four most recent English-language publications read as follows: T. R. McGuire, C. J. Kriessmann. Phys. Rev., 85, 1952, 452; D. S. Bloom, N. J. Grant. J. Metals, 3 (11), 1951, 1009; C. Stein, N. J. Grant. J. Metals, 7 (1), 1955, 127; E. P. Abrahamson, N. J. Grant, J. Metals, 8 (8), 1956, 975.

ASSOCIATION: Ural'skiy politekhnicheskii institut (Ural Polytechnic Institute)

SUBMITTED: March 21, 1960

Card 5/7

KRENTSIS, R.P.

28 (5)

AUTHORS:

Serebrennikov, N. N., Krentsis,
R. P., Gel'd, P. V.

3/032/60/026/01/038/052
B010/B006

TITLE:

Device for Calorimetric Measurements in Vacuum at High
Temperatures

PERIODICAL:

Zavodskaya laboratoriya, 1960, Vol 26, Nr 1, pp 109 - 111 (USSR)

ABSTRACT:

A device for determining the heat content and the heat of phase changes of metals and alloys at high temperatures ranging from 100 to 1700°C is described. The device consists essentially (Fig 1) of a Skuratov calorimeter (Refs 1,2), a furnace for sample heating, and an electric measuring unit. The furnace is arranged above the calorimeter and is thermally insulated from it. The sample is suspended in the furnace by a thin molybdenum- (or tungsten-) wire. On attaining the required temperature, the wire is fused by switching on an electric contact. The sample drops into a conical groove in a copper block placed in the thermostat. The temperature of the sample is measured by a Pt-Pt/Rh thermocouple. Since the system is hermetically sealed, tests can be carried out in a corresponding vacuum by applying a VN-461 pre-vacuum pump or a N-5 high-vacuum pump. Slight

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Device for Calorimetric Measurements in Vacuum
at High Temperatures

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B010/B006

amounts of alcohol vapors are introduced into the system to ensure rapid heat exchange between sample and copper block. Heat exchange is thus completed in 12-15 minutes. Electrolytic copper samples (99.95% Cu) were used to calibrate the device. The temperature function of the change $\Delta H_0^{t^\circ C}$ in heat content of highly alloyed EI481 steel was determined (Fig 2). Up to 900°C measurements were carried out using the nonhermetical device described in references 1, 2; above 900°C, the present device was used. Above 1350°C the differential method was applied. Up to 1550°C, the courses of the curves of the heat content and the specific heat can be described by equations. The steel investigated has a melting interval of 1350 - 1470°C. The heat of fusion is 65 cal/°C and the specific heat of the molten steel at 1470 - 1550°C is 0.194 cal/°C. There are 2 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskii institut im. S. M. Kirova (Ural Polytechnic Institute imeni S. M. Kirov)

Card 2/2

S/137/61/000/002/001/046
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1961, No. 2, p. 3, # 2A24

AUTHORS: Krentsig, R.P., Serebrennikov, N.N.

TITLE: Studying the Enthalpy of Ferroalloys at Temperatures up to 1,600°C

PERIODICAL: "Tr. Ural'skogo politekhn. in-ta", 1960, No. 105, pp. 136 - 141

TEXT: A description is given of the design of an adiabatic vacuum calorimeter of a preheating furnace and a cooler for determining the heat content ΔH of commercial ferroalloys. A Cr-Al addition alloy was investigated, containing (in %): Cr 63.91; Al 18.11; Fe 16.55; Si 0.67; C 0.024; and S 0.004. The low temperature branch of the $\Delta H - T$ curve in the 273 - 973°K range is described by interpolation polynomial: $\Delta H_{273.1}^L = -27.25 + 0.0982 T + 0.04492 \cdot 10^{-3} T^2 - 794.5 T^{-1}$, and in the 1073 - 1473°K range holds the linear dependence: $\Delta H_{273.1}^L = -64.6 + 0.203 T$. The authors determined the temperature dependence of changes in ΔH of Fe-Ti of the following composition (in %): Ti 27.5; Al 6.74; Si 4.30; C 0.051; P 0.025 and S 0.020. On the $\Delta H - T$ curve a break is observed at 1,200°C caused

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S/137/61/000/002/001/046
A006/A001

Studying the Enthalpy of Ferroalloys at Temperatures up to 1,600°C

by the melting of polycrystalline eutectics. For calculating ΔH of Fe-Ti in the 273 - 1,473°K range, the following equation is proposed: $\Delta H_{273.1}^T = -25.61 + 0.09809 T + 0.03401 \cdot 10^{-3} T^2 - 1011.7 T^{-1}$.

B. L.

Translator's note: This is the full translation of the original Russian abstract.

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S/263/62/000/012/004/005
1007/1207

AUTHOR: Serebrennikov, N. N., Krentsis, R. P. and Gel'd, P. V.
TITLE: Device for determining heat content (enthalpy) of solid and liquid alloys or steels
PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 12, 1962, 44.
abstract 32.12.424 In collection "Fiz.-khim. osnovy proviz-va stali" M., AN SSSR, 1961.
287-292

TEXT: A vacuum-type adiabatic calorimeter is described for determining the thermophysical parameters of various metals and alloys. The device comprises a calorimeter, furnace for heating test specimens, and electric measuring instruments. The device, working on the mixing principle, permits measurements up to 1500-1700°C, the study of the temperature dependence of enthalpy and specific heat of steel in the range from ambient to melting temperatures, and determination of the heat of melting (fusion). The method of calibration and checking of the device is outlined. Results are reported on investigations of the temperature dependence of enthalpy for ЭИ572 (EI572) and 18ХНВА (18 KhNVA) steel grades. The course of the temperature dependence was found to be different for the steel grades investigated. Large inclusions of carbon and alloying elements markedly decrease the initial melting point (1375°C for EI572 steel and 1485°C for 18KhNVA and widen the range of the melting temperature (by 125°C and 40°C for the EI572 and 18KhNVA steel grades respectively). The melting heat was found to be 57 cal/g and 60 cal/g for the investigated steel grades. There are 4 figures and 7 references.

[Abstracter's note: Complete translation.]

Card 1/1

88502

18.8100

S/149/61/000/001/004/013
A006/A001

AUTHORS: Serebrennikov, N.N., Gel'd, P.V., Krentsis, R.P.
TITLE: Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya,
1961, No. 1, pp. 82 - 87

TEXT: The specific heat content of ferroniobium and ferrotitanium as a function of variable temperatures was studied within a range of 0 - 1,600°C (Ref. 1, 2, 3) in non-hermetic and vacuum calorimeters. The data obtained were reduced to zero degrees (standard conditions) on the basis of auxiliary tests made with the aid of an ice cooler (Ref. 1). Results obtained are given in the table below:

Results of measuring ΔH_0^t of ferroniobium and ferrotitanium

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A006/A001

Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

1 Tests made on
a vacuum device
without crucibles

2 Tests made on
a vacuum device
with crucibles

Ферроний		Ферротитан	
Ferroniobium		Ferrotitanium	
°C	ΔH_0^t , ккал/г cal/g	°C	ΔH_0^t , ккал/г cal/g
20,3	1,929	21,06	2,617
27,8	2,698	26,95	3,279
99,3	9,750	166,8	21,25
202,6	20,41	199,4	25,66
303,5	30,98	205,9	26,51
403,0	42,45	401,1	54,16
501,1	54,36	602,5	85,03
508,1	52,75	702,6	101,6
599,8	65,25	800,5	118,7
707,2	77,40	901,3	137,7
805,7	91,49	1001	158,3
917,5	105,6	1100	174,9
1014	117,1	1103	175,8
1107	131,5	1111	175,4
1212	140,6	1202	190,6
1300	158,4	1300	227,2
1400	168,9	1400	280,8
1500	192,6	1450	347,6
1550	195,6	1508	354,8
—	—	1600	379,1

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Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

Commercial ferroniobium melt of the following composition was investigated (in %): 58.55 Nb; 17.09 Fe; 7.40 Ti; 10.91 Si; 1.17 Zr; 0.53 Cr; 3.34 Al; 0.09 P; 0.042 Cu and 0.011 S. The temperature dependence of the experimental heat content, illustrated by Graph 1, shows that in the temperature range investigated, no noticeable anomaly of the heat content was observed. The experimental data can be expressed by the empiric formula $\Delta H_{273.1}^1 = -30.28 + 94.55 \cdot 10^{-3} T + 14.67 \cdot 10^{-6} T^2 + 920 \cdot T^{-1}$ cal/g which, with an accuracy of up to 1.5%, is correct for a range of 273 - 1,873°K. It results from this equation that the true specific heat capacity of ferroniobium is $C_p = 94.55 \cdot 10^{-3} + 29.34 \cdot 10^{-6} T - 920 \cdot T^{-2}$, cal/g. degree in the same temperature range. Using characteristics of α Ti which are approximately equivalent to Ti properties in the alloy, and taking into account the heat content of silicon and niobium, a satisfactory agreement between experimentally determined ΔH values and those calculated by the rule of additivity, Formula (6), is obtained;

$$\Delta H_{\text{add}} = 0.59 \Delta H_{\text{Nb}} + 0.11 \Delta H_{\text{Si}} + 0.19 \Delta H_{\alpha\text{Fe}} + 0.04 \Delta H_{\text{Al}} + 0.07 \Delta H_{\alpha\text{Ti}}$$

The calculation method described is recommended to determine the heat content of commercial ferroniobium. The heat content of ferrotitanium containing 1) (in %):

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A006/A001

X

Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

27.5 Ti; 6.74 Al; 4.30 Si; 0.051 C; 0.025 P; 0.020 S and 2) 19.46 Ti; 3.07 Si; 3.66 Al; 0.08 C; 0.03 S and 0.04 P, was investigated in a vacuum calorimeter at temperatures over 1,000°C and in a non-hermetic calorimeter at lower temperatures. The temperature dependence of the heat content is illustrated by Graph 2. At a temperature over 1,270° when a liquid phase was formed, the heat content was determined by the differential method using alundum crucibles whose temperature dependence of heat capacity was previously studied for 700 to 1,600°C. The latent melting heat was found to be 115 cal/g, which was somewhat higher than that recommended by Kubashevskiy and Evans (95 ± 10 cal/g) (Ref. 4). To check the applicability of the Kopp-Neuman law, data on the temperature dependence of ΔH_{Fe} (Ref. 4); ΔH_{Si} (Ref. 5), ΔH_{Al} (Ref. 4), and ΔH_{Ti} (Ref. 9) (see Figure 2) were used. The calculation of the additive sum of heat contents was performed for an alloy of simplified composition (27.5% Ti; 61% Fe; 4.5% Si and 7% Al). Calculated values of ΔH_{add} and experimentally values (ΔH_{exp}) disagree by about 13% at 600 - 800°C. Therefore experimental data were compared with characteristics of high temperature iron and titanium modifications using for γ Fe results given by Darken and Smith (Ref. 10). Results obtained from additional tests with technically pure Ti and Ti iodide (Figure 4) show that over 880°C the heat content of

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S/149/61/000/001/004/013
A006/A001

Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

β -Ti increases linearly with temperature, i.e. its heat capacity does not depend on temperature and amounts to 0.164 cal/g.degree. These measurements prove the insufficient accuracy of Backhurst's data (Ref. 9) obtained with the aid of a high-temperature adiabatic calorimeter. The results obtained by the authors are in a better agreement with data given by Golutvin (Ref. 11) and can be successfully employed to check the applicability of the Kopp-Neumann law. However, the discrepancy between experimental data and those obtained by the rule of additivity is still 10% at 600 - 800°C and is explained by the arbitrary selection of the heat content of Ti, Fe and Al. The empirical processing of experimental results makes it possible to recommend the following equation to calculate the heat content of ferrotitanium:

$$H_{273.1}^T = -25.61 + 98.09 \cdot 10^{-3}T + 34.01 \cdot 10^{-6}T^2 - 1012 T^{-1} \text{ cal/g}$$

correct with 1.2% accuracy for a temperature range of 273 - 1,573°K. Consequently the heat capacity of the alloy varies with temperature in accordance with the equation $C_p = 98.09 \cdot 10^{-3} + 68.02 \cdot 10^{-6}T + 1012 T^{-2} \text{ cal/g} \cdot \text{degree}$. The data submitted show the connection of thermophysical and structural characteristics of alloys and demonstrate the errors which may arise when using the rule of additivity

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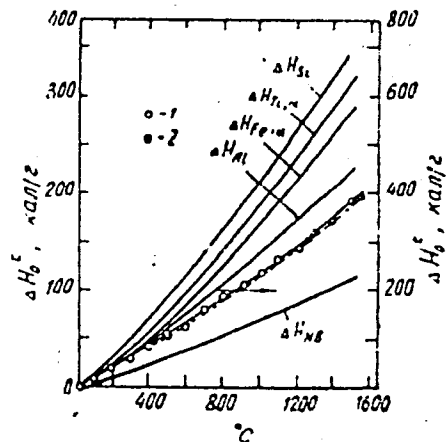
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A006/A001

Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

without previously establishing its applicability.

Figure 1

Polytherm ΔH_{exp} of ferroniobium from results of tests made on non-hermetic (1) and vacuum (2) devices. Dotted line - additive curve



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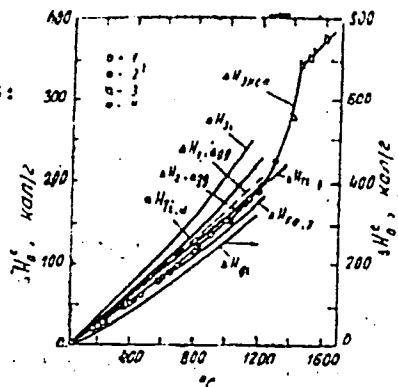
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A006/A001

Heat Content of Ferroniobium and Ferrotitanium at High Temperatures

Figure 2

Polytherm ΔH_{exp} of ferrotitanium obtained from tests:
1) on a non-hermetic device; 2 - on a vacuum device
without crucibles; 3 - on a vacuum device with cr-
ucibles; 4 - Serebrennikov's and Gel'd's data (7).
Dotted line - additive curves.



There are 1 table, 4 figures and 11 references: 9 Soviet and 2 English.

ASSOCIATIONS: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute)
Kafedra fiziki (Department of Physics)

SUBMITTED: April 25, 1960

Card 7/7

S/148/61/000/003/001/015
A161/A133

AUTHORS: Serebrennikov, N. N., Gel'd, P. V., Krentsis, R. P.
TITLE: The enthalpy and melting heat of steels. Medium-alloy and high-alloy steels

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 3, 1961, 5 - 10

TEXT: The article is the second of two presenting the results of an experimental investigation. The first, by same authors, contained data on carbon and low-alloy steels (Ref. 5: Izv. vyssh. uch. zavedeniy. Chernaya metallurgiya, no. 11, 1960). A description of the testing equipment and techniques had been given in three former publications, two in 1954, and the latest in 1960 (Ref. 3: Zavodskaya laboratoriya, no. 1, 1960, same authors). Seven steel grades were studied, four of austenitic and three of ferrite-carbide base type. References are made to parallel studies by J. Pattison and T. Lonsdale (Ref. 4: J. Iron and Steel Inst., 183, 1956, 284) and I. Backhurst (J. Iron and Steel Inst., 189, 1958, 124). Alundum crucibles and the differential method were used for studies at temperatures above 1,300 - 1,400°C, and the enthalpy

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The enthalpy and melting heat of steels. Medium-alloy ...A161/A133 S/148/61/000/003/001/015

variations were determined with an ice chiller. The chemical composition of the investigated 7 steel grades is given in a table. A drastic difference was stated in the behavior of austenitic and ferrite-carbide base steel types, which is explained by the different heat capacity of gamma iron in austenitic steel and alpha iron in the ferrite-carbide grade (prior to the eutectic transformation temperature). No comparison is made with the data obtained by the mentioned non-Soviet experiments and a German one (Ref. 7: P. Oberhoffer, W. Grosse, Stahl u. Eisen, 47, 1927, 570) in view of different steel compositions tested, but considerable errors in the I. Backhurst data are pointed out. The conclusion is made that obviously the melting heat may vary considerably with variations of the steel composition. In the austenitic group the heat capacity of metal obviously depends mainly on the nickel content. The other conclusion is that the additivity rule can be considered as verified and the Kopp-Neumann rules may be applied for steel in the solid stage. There are 3 figures, 5 tables and 7 references: 4 Soviet-bloc and 3 non-Soviet-bloc. The two references to English-language publications read as follows: J. Pattison, T. Lonsdale, J. Iron and Steel Inst., 183, 1956, 284, and I. Backhurst, J. Iron and Steel Inst., 189, 1958, 124.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (The Ural Polytechnic Institute)

SUBMITTED: June 11, 1960

Card 2/2

SELEBREMNIKOV, N.N.; GEL'D, P.V.; KRENTSIS, R.P.

Heat content of ferroniobium and ferrotitanium at high temperatures. Izv. vys. ucheb. zav.; tsvet. met. 4 no.1:82-87 '61. (MIR 14:2)

1. Ural'skiy politekhnicheskiy institut, kafedra fiziki.
(Iron-niobium alloys--Thermal properties)
(Iron-titanium alloys--Thermal properties)


S/263/62/000/011/014/022
1007/1207

AUTHOR: Tsiovkin, Yu. N. and Krentsis, R. P.

TITLE: Low-temperature adiabatic calorimeter

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 11, 1962, 41, abstract 32.11.320. "Tr. Ural'skogo politekhn. in-ta", sb no. 114, 1961, 75-80

TEXT: An installation is described consisting of a copper container immersed together with a heat exchanger in a Dewar vessel filled with a coolant. 18 vacuum-tight copper conductors pass through the heat exchanger where they are wound around an internal sleeve directly connected with the coolant; through an opening in the upper flange of the heat exchanger, the conductors are connected with a drum fastened to this flange. The drum is provided with a box filled with needles intended to simulate a thermodynamic black body. Both the screen system for preventing the heat exchange and the calorimeter representing a thin-walled closed copper cylinder are fastened to the drum by means of a plexiglass ring. The heating element is made of 0.07 mm gage constantan wire. The temperature within the calorimeter is measured by means of an electric-resistance platinum thermometer. The heating time is determined by means of an electromagnetic relay which, simultaneously with the connection of the heating element, delivers the signal from a quartz generator to the input of a measurement-conversion unit. An automatic potentiometric device permits the recording of a continuous "temperature versus time" curve. Measurement of specific heat at



Card 1/2

Low-temperature adiabatic calorimeter

S/263/62/000/011/014/022
1007/1207

a given temperature takes one hour; the over-all error in determining the energy fed to the calorimeter heating element does not exceed 0.1 %.

[Abstracter's note: Complete translation.]



Card 2/2

S/148/62/000/011/001/013
E071/E151

AUTHORS: Krentsis, R.P., and Gel'd, P.V.

TITLE: On the thermochemistry of iron silicides, heat capacity, enthalpy and entropy of Fe_3Si

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no.11, 1962, 12-19

TEXT: In view of the absence of reliable data on the effect of temperature on the heat capacity, enthalpy and entropy of iron silicides, and also that of their phase transformations, the authors carried out some new determinations of ΔH , c_p and S of pure iron silicides. In this paper thermochemical constants of Fe_3Si are reported for completely ordered (checked by optical and X-ray methods) materials. Low temperature (55-300 °K) determinations of heat capacity were made in an adiabatic calorimeter, using solid and liquid nitrogen and ice as cooling agents. Enthalpy (0 - 1500 °C) was investigated in mixing adiabatic calorimeters. The experimental procedure is described in some detail. In all cases experimental errors were about 1%. The temperature-enthalpy curve is characterised by three distinct

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On the APPROVED FOR RELEASE: Monday, July 31, 2000

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On the thermochemistry of iron ... S/148/62/000/011/001/013
E071/E151

anomalies; about 835 °K (magnetic transformation); 1325 °K (structural weakening); and 1524-1536 °K (melting). Formulae for the variation with temperature of enthalpy and heat capacity were derived for the temperature ranges 273-800 °K, 900-1520 °K and 1540-1800 °K. The entropy of Fe_3Si at various temperatures was calculated. The value of $S_{298.16}$ was 24.76 cal/mole.deg ($\pm 0.6\%$). The latent heat of melting was evaluated as about 70 ± 6 cal/g and the heat of formation $\Delta H = 18.3$ kcal. There are 3 figures and 3 tables.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: November 25, 1961

Card 2/2

18.1141

S/126/62/013/002/019/019
E039/E135

AUTHORS: Krentsis, R.P., and Gel'd, P.V.

TITLE: The thermal capacity of iron silicides in the range
55 to 300 °K

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.2, 1962,
319-320

TEXT: The temperature dependence of the thermal capacity of the silicides of iron (Fe_3Si ; Fe_5Si_3 ; FeSi ; FeSi_2 ; and $\text{FeSi}_{2.33}$) was studied with the aid of a low temperature adiabatic calorimeter. The alloys were produced by melting single crystal silicon and reduced iron in a quartz crucible under argon in an induction furnace. Subsequent heat treatment produced practically single phase alloys. The samples were then ground in an agate mortar and transferred to a calibrated calorimeter for thermal capacity measurements. For Fe_3Si and Fe_5Si_3 the experimental values of entropy are greater than the calculated values, while in the case of FeSi_2 and $\text{FeSi}_{2.33}$ the calculated values are the greater. Good agreement is obtained for FeSi .

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X

The thermal capacity of iron

S/126/62/013/002/019/019
E039/E135

The temperature dependence of the average atomic thermal capacity is shown graphically. The curves fall into two groups. In the first group belongs the ordered solid solution of silicon in iron Fe_3Si and Fe_5Si_3 . In this case there is little deviation from the calculated curve and they follow the Dulong and Petit law as in the case of iron. In the second group FeSi_2 and $\text{FeSi}_{2.33}$ the thermal capacity does not conform to the calculated curve but becomes even less than silicon at low temperatures (below about 100 °K). In the case of FeSi the thermal capacity curve falls steeply with decreasing temperature, becoming less than silicon at about 80 °K while at temperatures above 200 °K its thermal capacity approaches that of iron. No anomaly is observed in the thermal capacity curves in the temperature range 55-300 °K for the materials studied.

There are 1 figure and 1 table.

ASSOCIATION: Ural'skiy politekhnicheskii institut im. S.M.Kirova
(Ural Polytechnical Institute imeni S.M. Kirov)

SUBMITTED: May 29, 1961

Card 2/2

KREPELA, K.

Czechoslovakia

Children's Pulmonary Department of the Thomayer
Hospital in Prague -- Prague (Dětské plicní
oddělení Thomayerovy nemocnice v Praze -- Praha);
Director: Z. ROTTER, MUDr.

Prague, Rozhledy v Tuberkulóze, No 1, 1963, pp 48-54

"Tuberculosis in Children and Adolescents Caused by
Primary Resistant Mycobacteria."

S/126/63/015/001/007/029

E111/E183

AUTHORS: Gel'd, P.V., and Krentsis, R.P.

TITLE: Some thermo-physical characteristics of iron silicides

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.1, 1963, 63-71

TEXT: Previously obtained data on the specific heats and entropies of Fe_3Si , Fe_5Si_3 , FeSi , FeSi_2 and $\text{FeSi}_{2.33}$ at 55-1925 °K are used to calculate the characteristic temperatures and entropies of melting of these compounds. A comparative analysis of these properties in relation to the composition and structure of the compounds is presented, and certain specific features of the melting process and short-range order in liquid iron silicides are discussed. An iron monosilicide crystal can be considered as made up of FeSi groups, with both metallic and covalent bonds, and this is reflected in the temperature dependence of the specific heat of FeSi : with falling temperature gradual "freezing" must occur of atomic vibrations in these quasi-molecular groups and they begin to oscillate as closed units. Both thermal and electrical properties

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Some thermo-physical ...

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of the higher silicides of iron confirm that here inter-atomic bonding is unequal and conditions for producing lattice vibrations are different. Both heats and entropies of fusion show considerable deviations between observed values and those calculated by some of the usual methods. The experimental data indicate that on melting iron silicides not only is the long-range order destroyed, but a substantial change occurs in the nature of the interaction between particles, character of structural units and degree of short-range order. This applies particularly to Fe_3Si in which some of the metallic bonds change to covalent on fusion; as a result, stable, quasi-molecular FeSi groups are formed. Fusion of α -lebeaite is similar, but in the case of monosilicide it consists merely in a certain structural disordering of the system. The authors emphasise that the evaluation of the extent of disordering during fusion solely by analysis of the relative deviation of the latent-heat values from the additivity law is adequate only when no substantial change in the nature of particle interaction occurs.

There are 3 figures and 1 table.

Card 2/3

Some thermo-physical ...

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ASSOCIATION: Ural'skiy politekhnicheskii institut im. S.M. Kirova
(Ural Polytechnical Institute imeni S.M. Kirov)

SUBMITTED: June 14, 1962

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KRENTSIS, R.P.; GEL'D, P.V.; KALISHEVICH, G.I.

Thermochemistry of iron silicides. Heat capacity, enthalpy and entropy of FeSi and Fe_5Si_3 . Izv. vys. ucheb. zav.; chern. met. 6 no.9:161-168 '63. (MIRA 16:11)

1. Ural'skiy politekhnicheskiy institut.

KRENTSIS, R.P.; GEL'D, P.V.; KALISHEVICH, G.I.

Thermochemistry of iron silicides. Heat capacity, enthalpy and entropy of lebeaultite. Izv. vys. ucheb. zav.; Chern. met. 6 no.11: 146-152 '63. (MIRA 17:3)

1. Ural'skiy politekhnicheskiy institut.

KALISHEVICH, G.I.; GEL'D, P.V.; KRENTSIS, R.P.

Heat capacity, enthalpy, and entropy of cobalt monosilicide.
Teplofiz. vys. temp. 2 no.1:16-20 Ja-F '64. (MIRA 17:3)

1. Ural'skiy politekhnicheskoy institut.

KRENTSIS, R.P.; GEL'D, P.V.

Certain thermophysical characteristics of iron silicides. Sbor.
nauch. trud. Ural. politekh. inst. no. 126:25-97 '63
(MIRA 17:3)

KRENTSIS, R.P.; RADOVSKIY, I.Z.; GEL'D, P.V.; ANDREYEVA, L.P.

Phase conversion of Mn_5Si_3 . Zhur. neorg. khim. 10 no.9:2192-2193
S '65. (MIRA 18:10)

L 10439-66 EWT(d)/EWT(1)/EWT(m)/EPR(n)-2/EWP(t)/ESP(b) IJP(c) JD/WT
ACC NR: AF6000292 SOURCE CODE: UR/0078/65/010/009/2192/2193

AUTHOR: Krentsis, R. P.; Radovskiy, I. Z.; Gel'd, P. V.; Andreyeva, L. P.

ORG: none

TITLE: Phase transition of Mn_5Si_3

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 9, 1965, 2192-2193

TOPIC TAGS: electric conductivity, magnetic susceptibility, manganese compound, silicide, phase transition, temperature dependence, heat capacity

ABSTRACT: The magnetic susceptibility and electrical conductivity of Mn_5Si_3 were studied in the range of 20 -- 300K. Measurements were taken on a pure, single-phase silicide sample annealed for 24 hr at 900C. The magnetic susceptibility was measured by the Faraday method in fields of 1000 Oe, and the electrical resistance by the standard compensation method. The results are shown in Fig. 1. The heat capacity values show distinct anomalies around 60K. The somewhat stretched temperature intervals of the anomalies of χ and ρ , which attain 20 degrees, are probably due to the fact that the measurements were taken under dynamic conditions. Above the transition point, the magnetic susceptibility of Mn_5Si_2 rapidly decreases with rising temperature; the Curie-Weiss law is followed closely in this region, and it follows that $\mu_{eff} = 3.9\mu_B$. The resistance grows fairly rapidly with temperature, indicating that the conduction is metallic in character. From the temperature dependence of the magnetic susceptibility it is concluded that the transition under consideration involves the breakdown of a weak ferromagnetic interaction and a change of the substance into the paramagnetic state.

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UDC: 546.711'22